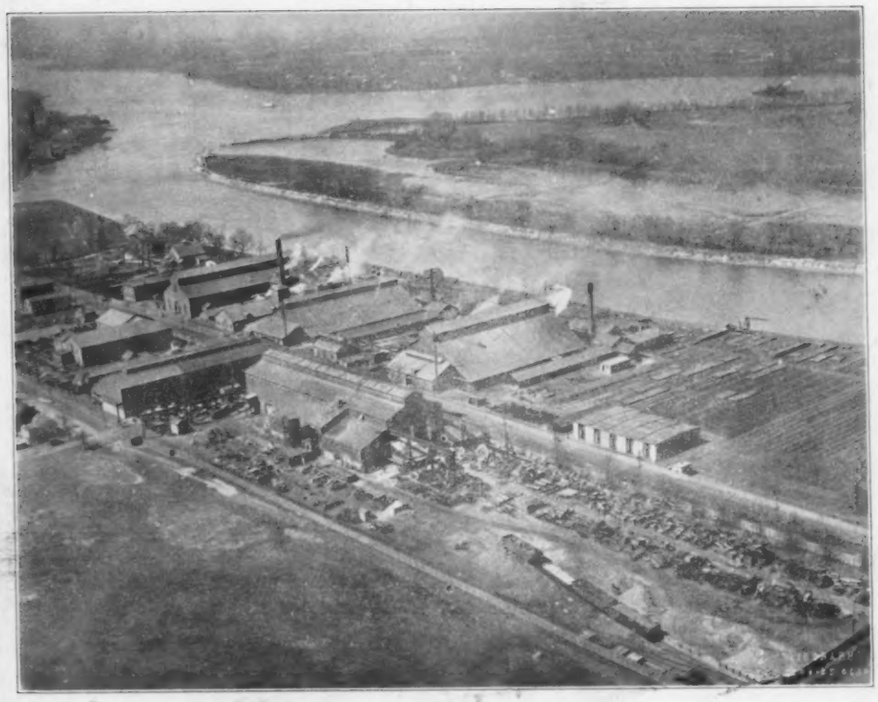
American
GAS JOURNAL
Formerly American Gas Light Journal
EST. 1859

VOL. 120. No. 25.
WHOLE NO. 3467.

NEW YORK, SATURDAY, JUNE 21, 1924

Subscription $2 per year
$4 Canada $5 Foreign



Aerial photograph of one of our eleven foundries, Burlington, N. J., Works, showing ideal location for rail or water shipment.

CAST IRON PIPE

The corrosion resisting qualities of cast iron pipe make it particularly adaptable for gas installations.

"USICAST"
CHEMICAL CASTINGS

Our extensive foundry and machine shop facilities enable us to build complete cast iron apparatus for gas manufacturers.

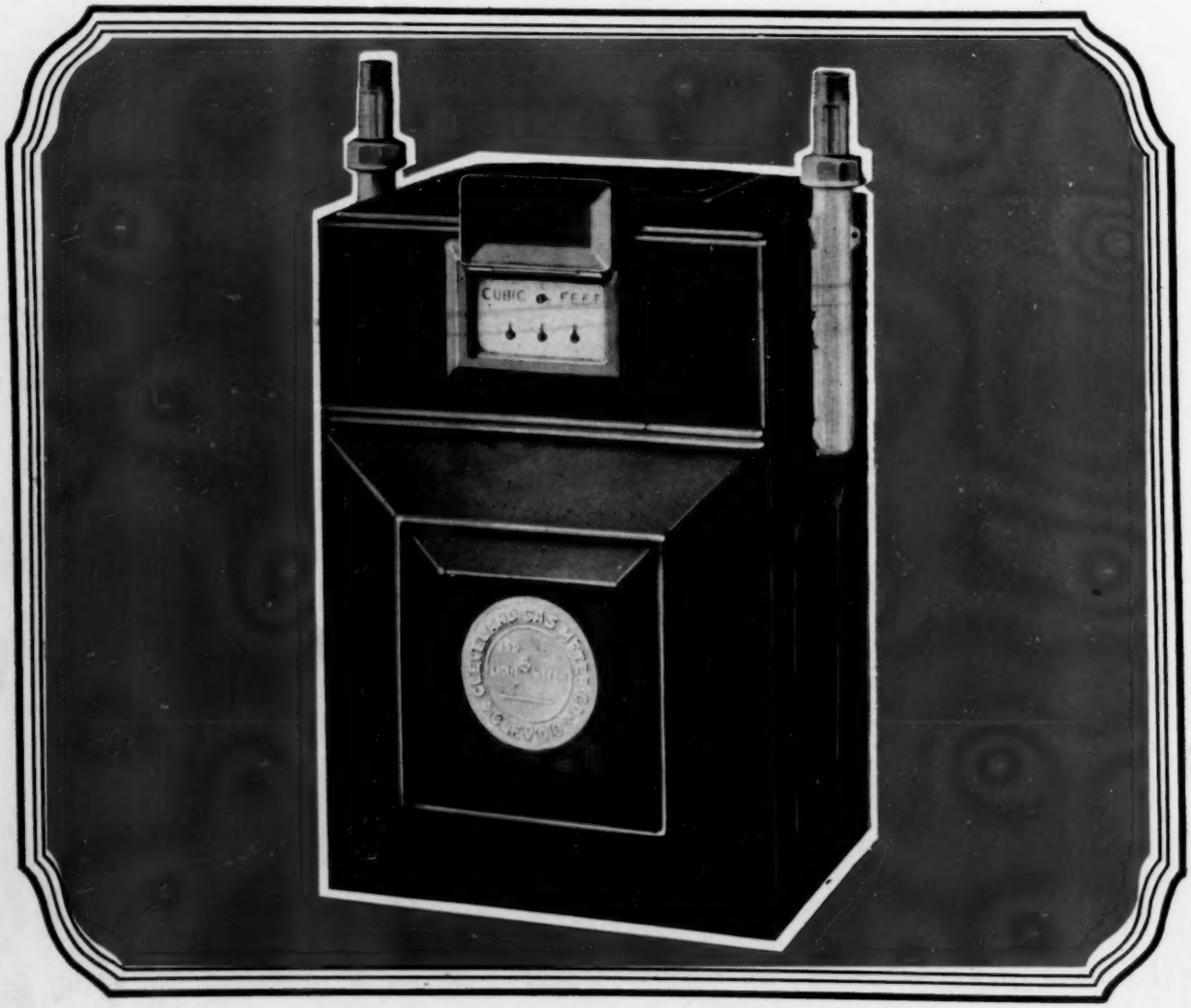
Write for Booklet

United States Cast Iron Pipe and Foundry Company

General Office: Burlington, New Jersey

Index to Contents, Page 4

Advertising Index, Page 35



Dependability in a gas meter means a constant measure of reliable service; this is appreciated by the Superintendent, the Meter-reader and the Consumer.

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

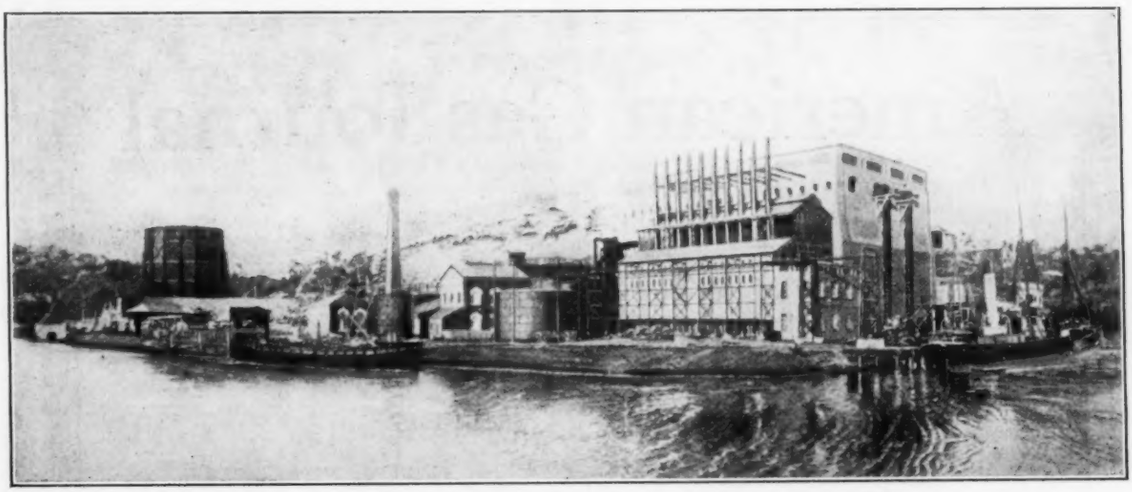
Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" and "B" Types Meter Repairing

CLEVELAND GAS METER COMPANY

2180 East 65th Street **Cleveland, Ohio**

P. F. McENANEY, 85 Hancock St., Brooklyn, N. Y., Eastern Representative



INSTALLED IN ALL PARTS OF THE WORLD

NORTH SYDNEY, Oyster Cove Gas Works N. S. W.

Daily Capacity	Three million cu. ft.
Coal Plant	Electric cranes and grabs for discharging steamers; two lines of pivoted-bucket conveyor with coal breakers for conveying and elevating coal and distributing it in the coal store; side-tipping wagons and railways from tunnels in the coal store which are at the level of the coal bunkers above the retort bench.
Coke Plant	Conveyor below the retort bench with elevator to ships transported by telpherage to the store.
Foundations	Cut out of the solid rock.
Electricity Generating Plant	Power house containing two direct-coupled gas engine-driven generators aggregating 120 k.w. capacity with switchboard and all connections to the driving gear of the installation.

particulars and estimates from

WEST GAS IMPROVEMENT CO.
of America, Inc.
150 Nassau St. New York

GLOVER-WEST
Vertical Retorts

Look at the Advertisements for the Leaders in the Industry.

American Gas Journal

SIXTY-FIFTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. & Treas. C. S. MYERS, Vice-Pres. A. M. GLEASON, Sec'y.

STANTON G. KRAKE, Managing Editor

ISMAR GINSBERG, Technical Editor

"APPLICANT FOR MEMBERSHIP IN THE AUDIT BUREAU OF CIRCULATIONS"

Contents of This Issue

The Fuel of the Future—What Shall It Be? XI. House Heating 565
By Ismar Ginsberg

The Rotary High Pressure Blower and Gas Pump 567
By E. Dwight Johnson

The Public Utility Employee—By A. W. Robertson 568

Here and There in Selling—By William H. Matlack 569

Who Sells Gas Ranges?—By Frank Farrington 570

Industrial Gas Lesson No. 25 571

As the Journal Views It 573
Municipal Ownership

Catechism of Central Station Gas Engineering 575
Twenty-fifth Installment

Thoroughness—By Lester G. Herbert 579

...scription $3.00 per year, including postage, in the United ...tates, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents

AMERICAN GAS JOURNAL, June 21, 1924. Vol. 120, No. 25. Published weekly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL

Vol. 120. No. 25 NEW YORK, JUNE 21, 1924 Whole No. 3467

The Fuel of the Future -- What Shall It Be?

XI. House Heating. Conversion of Furnaces and the Physiological Aspect of House Heating

Ismar Ginsburgh
B. Sc., Chemical Engineer

THE previous articles, which have been concerned with the question of house heating as one of the specific subjects under the general heading, "The Fuel of the Future—What Shall It Be?" have dealt with the economic and technical standpoints of the problem. The economic aspect was described in the first article and in that paper an attempt was made to show that the future of house heating is bound up with the formulation of rate structure in which a demand charge was included. Since the writing of that article, experience gained by one of the largest gas companies in the United States, which has been making a specialty of house heating business, has shown that it is not safe for the company to treat the house heating business under a special rate system, as distinguished from ordinary industrial business. The conclusion seems to have been reached that the only practical plan, the one that will be fair both to customer and to gas company, is to consider house heating in the same category as industrial business and to apply the same rate to the same. The rate used in both classes of gas business must contain a commensurate demand charge and a correspondingly low commodity charge in order to make the business profitable to the gas company.

The Technical Side of the Business

In the next article on house heating there was discussed the matter of existing installations, the steam, hot air, hot water, exhaust steam and other heating systems that are in use at the present time. The properties, advantages and disadvantages of all these systems were described. The articles which followed were concerned with the calculation of the quantity of heat that has to be supplied to obtain certain temperatures within the house or room when the temperature of the external air is fixed at certain definite points. The information which is yielded by this computation enables the gas engineer to calculate the size of furnace he requires to heat the house, and it likewise enables him to tell the customer just how much gas he will have to contract for at a maximum demand to keep his house at the desired temperature under the most severe weather conditions. In other words, it will enable him to fix the demand charge and adjust the limited demand meter so that no more than a certain maximum supply of gas will pass through in an hour's time.

Existing Systems and New Systems

The next question which comes up for discussion is the methods which are to be used in the installation of gas heating in houses which now have other systems or in which there is no heating system at all. The latter case refers more particularly to new houses.

There is no question but that the ideal thing to do is to install a gas-fired furnace which has been especially designed for use with gas. The gas man may not be aware of the fact that certain details must be changed in the gas-fired furnace in contradistinction to those that give good results in the coal-fired apparatus. The gas engineer is somewhat too apt to think that all that it is necessary to do is to insert a gas burner or a series of burners into the old furnace when converting the same into a gas-fired furnace, and turn on the gas. Such practice will not give good results, and, if indulged in, will act as a boomerang and redound to the discredit of the gas company. It will serve to make the task of house heating all the more difficult to solve from the gas man's standpoint.

Fundamental Conditions Involved in Conversion

Before making a conversion of the old style of furnace into the new gas-fired furnace the gas engineer should remember that the prevalent condi-

tions will have to be suitable for gas burning in order to obtain the proper results. Even with the ordinary furnace, which is burning anthracite coal of stove or nut size, it is necessary to change the grate in converting the same to burn pea, rice or barley coal, not to say for burning soft coal or coke. Each fuel can be burnt under certain conditions which are most advantageous for efficiency and economy, and it is necessary to make the changes that are indicated and required, so that the fuel burns with the best results.

Gas a Competitive Fuel

In the use of gas as a househeating fuel, it must be remembered that it is a competitive fuel in that field. It must compete with oil and with coal, and if the results obtained with gas are bad it stands no chance at all against the cheaper fuels. The gas engineer must, therefore, exert the utmost care in making his plans for the introduction of gas as a fuel in house heating. He must realize that he cannot attain the ideal condition in the great majority of cases, viz., of being permitted to install a furnace which is specially designed for his fuel. He must convert existing installations into a condition so that they are able to burn gas with efficiency and economy, and in order to do so he must take cognizance of the factors that determine whether or not the fuel is going to give the desired results in the converted apparatus. He cannot and dare not be careless in his methods of approaching and solving this problem, and he must forget entirely, if he ever had the idea in mind, that it is a simple matter just to insert the gas burner in the furnace, light the gas and thereby expect the problem to solve itself. This will not take place, and the results will only be to his discredit and to the discredit of gas.

Fundamental Principles Involved in the Conversion

There are two considerations which must be borne in mind in making the conversion, in order to obtain good efficiency and economy with the use of gas in a furnace that was formerly fired with coal of some sort. These are the surface area available for radiation of heat that is afforded in the apparatus and the arrangement of the surfaces so that the heat radiation is carried out to the best advantage. In the converted coal-fired furnace it is necessary to create sufficient radiation surface so that the heat in the burning gaseous fuel is utilized to advantage.

Another consideration that demands attention in this connection is that the area of the radiating surface is controlled to a large degree by the intensity of the temperature. It is known that the radiation of heat from a hot body depends on the fourth power of the temperature differential. Hence, the higher the temperature of the hot body the less its surface area needs to be, in order to radiate a given proportion of the heat contained in it. The high combustion temperature in the case of gaseous fuel has a very favorable effect on the design of the surface of radiation. Less radiating surface need be provided than would otherwise be the case. The result is that the ease of arranging the radiating surface within the old furnace is greatly enhanced.

The Gas Fired Hot Air Furnace

In taking up the study of the gas-fired hot air furnace the question arises as to the relative values of the different heating systems, which were formally discussed in a previous article, but which are of sufficient importance in the study of the house heating problem from the gas man's standpoint to bear repetition and further attention. There is no doubt but that the hot air system possesses important advantages, such as lower first cost, less space occupied by the registers than by radiators, the possibility of humidifying the air and controlling the percentage of moisture in it and the ventilation of the rooms of the house by the continuous entrance of fresh air, heated in passing through the hot air furnace and the ease with which the room temperature is controlled by regulating the furnace itself. All these advantages are enhanced and become of even greater importance when gas is employed as the fuel.

The Checker-Work Radiation Surface

There are various designs of hot air furnaces, but in principle they are all alike, and any type of hot air furnace can be converted into a gas-fired furnace with but little difficulty. Of course, the first thing to do is to remove the grate and to arrange in its place a radiating surface. This can be done by using firebrick in building up a checker-work affair, so that the hot gases of combustion will come in contact with it, and heat it up to high temperature on their passage into the flue. Air then passes around the casing, which is built surrounding the furnace and is heated up by the radiation of heat from the hot checker-work. The gas burners are located underneath the checker-work in what was formerly the ash pit of the furnace.

A standard heat regulator may be employed to control the burning of the gas so that the gas is turned on when the temperature reaches a certain point and is turned off again after the temperature has attained the desired height. A pilot light is also provided so that the gas issuing forth from the burner is immediately ignited. The pilot light will have to be fed with gas independently of the main burner.

Arranging the Checker-Work

The arrangement of the checker-work, or baffling, as it is sometimes called, inside of the furnace, must be effected in a careful manner. Haphazard methods will not produce good results. In a round furnace it is customary and was found to give good results in the experiment conducted on house heating in Denver to build the checker-work in the following manner: The base is a circular brick of four to six inches in height and three to four inches in diameter. Then the next layer forms a circle about six inches smaller

(Continued on page 580)

*The Rotary High Pressure Blower and Gas Pump

The care, operation and general working details

E. Dwight Johnson

President and General Manager, the P. H. & F. M. Roots Co., Connersville, Ind.

DIRECTIONS for the proper erection and installation of all units are furnished by manufacturers, and since these points are so generally well understood it will be unnecessary to mention any items of detail. Large units are always dismantled for shipment, while small units are, as a rule, shipped assembled. It is necessary to exercise careful attention to unloading and erecting of units, so that no damage may result from careless handling. Foundations can be prepared in advance and anchor bolts in foundations as a rule are set in pipes so that any slight misalignment in the templet or forms will not cause serious inconvenience when the machine is placed on the foundation. By placing the anchor bolts in pipes, slight adjustments can be made very conveniently.

Setting of Blower Important

It is necessary that very careful attention be given to setting of the rotary unit. The machine should be leveled in both directions. When the prime mover is connected, the connection should be made so that no thrust or pull will be placed on the driving shaft of the rotary machine. If misalignment occurs, then the driving impeller will always be in contact with one headplate, which will result in wear and eventually a loss in volumetric efficiency.

The piping connections to the gas pump should be very carefully made, so that the pipe plates will not be sprung. Misalignment at this point may be great enough to cause the entire unit to be severely sprung, which will result in interference of the operating parts.

Care of the Bearings

The bearings should always be very carefully cleaned before the unit is placed in operation. The gear housing should be carefully flushed out and new oil applied. In order to eliminate future trouble with stuffing boxes, care should be continuously taken to keep ample lubrication on the packing in the stuffing boxes. If the packing becomes dry and hard it will score the shaft sleeves, and under such conditions it is quite impossible to expect any packing effectively to hold against the gas pressure. Practically all of stuffing box trouble results from lack of proper lubrication of the packing.

*The first part of this article dealing with the historical development and design of the high pressure rotary blower was published in the March 8th issue of the American Gas Journal.

Lubricating System

The general lubrication of the rotary gas pump is very simple. The bearings of practically all units are of the self-oiling type and require no attention other than the occasional renewal of the oil in the reservoirs which are located in the lower portion of the bearing boxes. The gears operate in an oil tight housing, which should occasionally be washed out and new oil supplied.

It is very essential that necessary inspections be made to insure the proper setting of all adjustments of bearings. The position of the bearing adjustments controls the location of the impellers in the case, and consequently any lowering of the bearings will eventually result in the impellers coming in contact with the case. This contact will wear away both the tip of the impeller and the case. Such wear can be overcome, providing it is not too great, by dismantling the machines and overhauling the entire unit, but it is much better to give proper care to the adjustments provided by manufacturers, which eliminate necessity of this expense.

Inspection of Gear

The gears may be inspected by removing the top half of the oil-tight housing. This inspection should occasionally be made to determine the action of the gears, also to make sure that the keys are secure. By carefully studying the lines of contact on the gear teeth, an operator can readily discover any misalignment of impellers and shafts.

After the rotary gas pump has been in operation sufficient time to have been throughly run in, it requires very little attention.

High Pressure Rotary Gas Pumps

The foregoing discussion dealt with the development of rotary positive displacement machinery, and due to the fact that high pressure service has now come into such common use, a brief survey of the development of the high pressure gas pump will be of special interest.

About thirty years ago the writer conceived the idea of building a high pressure gas pump of the rotary positive displacement type. At that particular time there was a demand for this type of unit to handle natural gas in the fields where the pressure from the wells was decreasing. At about the same time it was also found necessary to give special attention to a high pressure blower unit to handle

(Continued on page 582)

The Public Utility Employee

The importance of personnel in the public utility field

A. W. Robertson

Vice-President Philadelphia Company

IMPORTANCE of personnel problems in the field of public utilities, expressed in other language, means that it is difficult to find the right kind of employees to operate our public utilities. The successful progress of every business concern depends upon the character and training of the men and women that perform or direct its activity. If the business is to grow and develop, provision must be made for the steady inflow of new employees and the equally steady development of employees who have demonstrated their fitness for the work; otherwise the enterprise becomes stagnant and the seeds of future decay are sown. The progressive, well-managed firm of today is devoting much time and energy, as well as money, to the selection of competent employees, as well as to their subsequent training. It is the duty of the Personnel Department to help the management of a public utility to develop and conserve the most important element which enters into industry, namely, the employee. Experience has proven again and again the economy of a force of high grade employees, as against a lower grade, given less compensation.

What Must Public Utilities Perform?

Public utilities include companies furnishing power, light, heat, transportation and communication; that is, electric companies, steam railroad and street railway companies, telephone and telegraph companies, gas companies, steam heating companies and others engaged in similar enterprises. It is a fundamental requirement of all of these utilities that their service shall be reliable, that is, uninterrupted; that it shall be reasonably adequate to meet the demand for it; that it is safe and that the price is fair and reasonable; and, above all, that the service is furnished courteously and with a smile. Almost without exception, the work of a utility goes on 24 hours a day, 365 days a year. It stimulates the imagination to know that every listener tonight, no matter how far from Pittsburgh he may live, is either a patron of a public utility or an employee of a public utility. All of us who live in cities depend upon our public utilities for necessary conveniences every day. Citizens of rural districts are not so dependent, but public utilities are also necessary for their comfort and convenience throughout the year.

Capital Required

To furnish this service, huge sums of money must be invested in plants and facilities. It is estimated that over $22,000,000,000 is invested in steam railroads in this country; over $5,000,000,000 in electric light and power, and this investment is growing by leaps and bounds. Like sums are invested in other utilities. All of this money must be obtained by the sale of securities to persons who have money to invest. The credit of the utility must be good or it cannot get the necessary funds to grow and improve its service.

All this vast investment in power houses, railroads, poles and wires, office buildings, etc., is necessarily entrusted to the employees of the several public utilities of whom it is estimated there are four to five million. On their shoulders is the responsibility of furnishing the service required. The plant and facilities, no matter how valuable, are useless without the human element. The employee is the breath of life, the living spirit, which, when applied to the train, the power plant, the street car or other facility, makes it possible to give public service. In some public utilities, there is an investment of $50,000 or $60,000 for each employee. These are general figures, the responsibility of any individual employee, of course, varying with his ability.

The Importance of Personnel Department

The Personnel Department of a public utility is the door through which all these employees pass; the future president of the company, as well as the humblest employee. Care in the selection of employees so that they may be suited to their respective tasks is important. When employees are properly selected, the work of the utility will be well done; when employees are improperly selected, good service is impossible and the utility will not prosper, and the public will undoubtedly have just cause to complain about bad service. Who can estimate the evil that may follow in the path of even one employee not properly equipped for his work? If he is careless he may endanger the lives of hundreds, and the loss of thousands of dollars in property. If his morals are not right, his corrupting influence may do untold harm. Instances need not be multiplied.

Essentials of a Public Utility Employee

The very nature of public utility work demands an employee above the average in ability, trustworthiness, faithfulness and courtesy. During a recent sleet storm the employees of the light and power companies, telephone and telegraph companies and railway companies were called upon to do almost impossible tasks. While the rest of the world slept, or listened to the icy blasts against their windows, the

(Continued on page 579)

GAS MERCHANDISING

Domestic – Industrial

Here and There in Selling

Some thoughts on advertising and merchandising

William H. Matlack

NO MATTER how good an advertisement, how well written, how artistically laid out, how instructive it may be or how much selling power it may possess, from the advertiser's standpoint, it is absolutely a waste if it does not sell, if it is not read. This is obvious, yet how many writers of advertisements give this fact due thought, when writing advertisements?

How many writers give the thought and attention necessary and put into the ad. "that thing" that puts the advertisement over, that gets it read, and thus, by reason of its being read and for the reason that it is a good selling talk, causes it to create a desire for the merchandise advertised—such a strong desire—that a sale is the natural sequence?

The Personal Touch

The "thing" we refer to, and which is so often omitted, is the personal touch. The average writer lets himself become so much concerned with good descriptive copy or good selling copy that he fails to focus his thoughts on the very thing that makes any sort of copy good. He writes with the ultimate customer out of mind; he writes without keeping his mind focused on folks and thus the copy is written in an impersonal vein rather than in the personal one necessary to interest those folks for whom it is intended.

Folks buy and read newspapers in hope of finding items, articles or advertisements pertaining to some phase of life in which they are interested; not so much for the general run of news, articles or general advertisements. It is safe to say that the writers of appliance advertisements who keep this in mind and who will frame their advertisements accordingly will find that they have greater pulling power.

Take, for example, an advertisement dealing with children, home management, better cooking or with "clear complexions" with a tie in to gas ranges or water heaters. Don't you believe it would produce more interest and a better come-back than prosaical "Bungalow Bakers Burn Less Gas" or "$5.00 Down Puts a Humdinger Gas Range in Your Kitchen"? Think it over; get the personal element woven into your advertisements.

Backing Up Good Will Advertisement

Good will advertising must be backed up by performance to be effective.

Courtesy comes from within the organization. As well as it is to write about it, it is not worth the time it takes to set it down on paper, unless it is to be accorded to each and every customer.

There must be an inborn or built-up desire on the part of each and every employee of the company to please—the public be pleased—the personality of employees must be pleasing and "different" from the veneered, tip-taking variety, found at the hat checking stand and in other public places.

Folks feel, instinctively, the presence of real courtesy and prove its worth and influence by their reaction to the company and the employee, rendering courteous service.

Turning a Hoodoo Into Sales

The Southern Public Utilities Co. of Charlotte, N. C., has given those who think of Friday, the thirteenth, as "black Friday" something to think about. This company opened up a campaign or special sale of automatic water heaters and based the whole scheme on the number thirteen.

The sale lasted thirteen days, automatic water heaters were sold at a discount of 13 per cent off of regular list price, the first person purchasing a water heater on the day the sale opened was given a special "Lucky 13 Sale" discount of $13, each thirteenth person purchasing an automatic water heater was given a special discount of $13, those who purchased on the divided payment plan were given thirteen months to pay. The sales closed on a Friday, the thirteenth. How come, thirteen is an unlucky number!

Sell the Customer Well

In selling a new customer or re-selling an old one due care should be exercised to sell him well. This is true when the appliance or service you are selling may not be "just as clear to him" as it might be. Remember, the well sold customer will tell

other folks about the merchandise you sell and about the treatment you accord him. He will be a "booster" for you, and thus help you to build up your business as nothing else might.

Sell the Proper Sized Heater for the Job

The salesman who is thinking of hot water service sells the proper size heater for each job, while the salesman who is thinking of price sells a water heater regardless of service to everyone he can. The reaction from sales of the latter kind are often remembered when the sale is forgotten. Sell the right size and type of water heater.

Every customer should be fully instructed regarding the appliance he purchases. A complete understanding of the water heater or gas range purchased will eliminate many so-called complaints, all of which cost the company money, and often create an unfavorable opinion in the mind of the customer that may take years to overcome. The way to be assured that the customer has a complete understanding of the appliance is to call again after installation has been made and, if necessary, make a demonstration. Co-operation of this kind means repeat orders and increased sales.

Some folks need "high brow" stuff, but most folks can be sold by plain 85 per cent American. Technical talk goes over the average home manager's head or only serves to "befuddle" him. It is well to know all there is to know about your merchandise from every angle, but it is seldom that you have to depart from "every-day language" to make a sale to a home manager.

Who Sells the Gas Ranges?

A few ideas of particular value to the smaller gas company

Frank Farrington

ARE you selling the gas ranges that are being installed in your community, or are you leaving it to someone else to get that business? There is this to be said in favor of the central station management going after such business: if it does so, it will know that the business is being pushed in such a way as to develop a maximum number of users of the ranges.

If you trust to such equipment being sold sufficiently well by others, those others may not be efficient merchants. They may not be making the most of their opportunities along that line, with the result that many people who are good prospects for gas ranges are not being induced to buy.

By getting after the gas range business actively you stimulate similar activity on the part of others handling the line, and the result is a greatly increased number of users.

The Value of Demonstrations

One of the good ways of interesting people in your line of gas ranges is by arranging for demonstrations. Perhaps the manufacturers of the stoves will provide demonstrators for you. If not, see what you can do in the way of interesting such demonstrators as represent concerns selling foodstuffs and habitually giving grocery store demonstrations. Talk this up with the most wide-awake local grocer and agree to co-operate with him by supplying the gas range and the gas, if he can get a demonstrator who is competent to work with one of your ranges. When you and the grocer combine to make such a demonstration effective, you will be able to give it more and better publicity than either could give it alone.

Demonstrations at food shows and any sort of local fairs and expositions will help, and you always have your own place of business available for them. Plan a long way ahead for such stunts in order that the demonstrator may be routed your way and secured with minimum expense.

(Continued on page 574)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 25

The radiation of heat

A Practical Example of Calculation of Heat Radiation

THE calculation of the loss of heat by radiation is not as simple as that of conduction. In the following example the heat loss or the heat transmitted both by convection and radiation is given. This calculation is of importance in a practical way in the determination of the amount of heat that is given off by an exposed steam radiator.

In the first place mention must be made of the following table, which is taken from Box's Practical Thesis on Heat, and shows the different quantities of heat that are radiated by different surfaces under similar conditions. It gives the number of B.t.u. that are radiated per hour when the temperature of the air is one degree Fahrenheit lower than the temperature of the radiating body. The table shows that copper radiates less heat than any of the other metals. This explains why hot water boilers are constructed of copper in preference to cast iron, for, as can be seen from this table, copper radiates considerably less heat per hour per unit surface area per degree difference in temperature between the radiating and receiving bodies than iron.

Radiation of Heat in British Thermal Units Per Square Foot of Surface Area for One Degree Fahrenheit Excess in Temperature

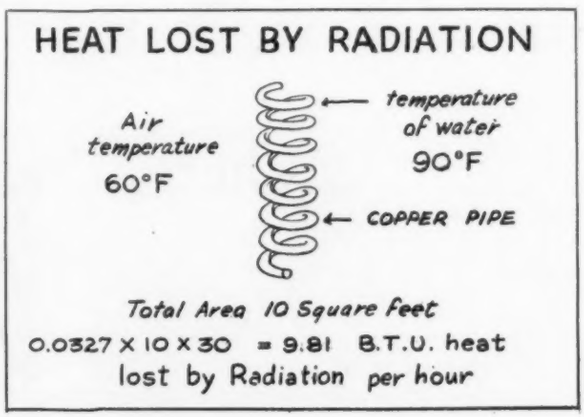
	Heat units
Copper, polished	0.0327
Tin, polished	0.0440
Zinc and brass, polished	0.0491
Tinned iron, polished	0.0858
Sheet iron, polished	0.0920
Sheet lead	0.1329
Sheet iron, ordinary	0.5662
Glass	0.5948
Cast iron, new	0.6480
Common steam pipe	0.6400
Cast and sheet iron, rusted	0.6868
Wood, building stone and brick	0.7358

It has been mentioned that for certain conditions the heat lost by radiation may be calculated from a relation which simply states that the loss in heat is dependent on the difference in temperature between the radiating and receiving bodies, a law known as Newton's law of cooling. This, however, holds good only when the temperature of the air is approximately 50 to 60 degrees F. and that of the body that is radiating the heat is only 30 degrees or less hotter than the air.

Heat Loss by Newton's Law of Cooling

An example will show how this calculation may be carried out. Suppose a hot water pipe contains water at a temperature of 90 degrees F. The pipe is made of copper and the total area of the pipe is 10 square feet. The temperature of the air to which this pipe is exposed is 60 degrees F. It is desired to find out how much heat is lost by radiation in the period of one hour, as the water flows through the pipe.

The above table gives a heat loss of 0.0327 B.t.u. per hour for every square foot of area in the case



of polished copper. As the total area in this case is 10 square feet, the total heat loss over the surface for a difference of one degree F. is 0.0327×10, or 0.327 B.t.u. per hour. But the temperature difference is 30 degrees F, hence this figure must be multiplied by 30, which gives the result of 9.81 B.t.u., heat loss by radiation per hour in the hot water pipe.

Use of Correction Tables

However, for temperature differences greater than 30 degrees F. and for air temperatures in excess of 60 degrees F., a complicated formula must be employed in the calculation. In order to simplify the

process and enable quick calculation of heat losses by radiation, which is important in many heat applications, and which is, therefore, of vital interest to the gas engineer, a table has been devised. This contains factors that must be employed in multiplying the heat loss, obtained by using Newton's simple law, in order to obtain the correct value of the loss of heat by radiation. This table is given below:

Correction Factors

Differences in Temperature between radiating Body and the Air	Temperature of the Air on the Fahrenheit Scale Degrees F.											
	32	50	59	68	86	104	122	140	158	176	194	212
18	1.00	1.07	1.12	1.16	1.25	1.36	1.47	1.58	1.70	1.85	1.99	2.15
36	1.03	1.11	1.16	1.21	1.30	1.40	1.52	1.68	1.76	1.91	2.06	2.23
54	1.07	1.16	1.20	1.25	1.35	1.45	1.58	1.70	1.83	1.99	2.14	2.31
72	1.12	1.20	1.25	1.30	1.40	1.52	1.64	1.76	1.90	2.07	2.23	2.40
90	1.16	1.25	1.31	1.36	1.46	1.58	1.71	1.84	1.98	2.15	2.33	2.51
108	1.21	1.31	1.36	1.42	1.52	1.65	1.78	1.92	2.07	2.28	2.42	2.62
126	1.26	1.36	1.42	1.48	1.60	1.72	1.86	2.00	2.16	2.34	2.52	2.72
144	1.32	1.42	1.48	1.54	1.65	1.79	1.94	2.08	2.24	2.44	2.64	2.83
162	1.37	1.48	1.54	1.60	1.73	1.86	2.02	2.17	2.34	2.54	2.74	2.96
180	1.44	1.55	1.61	1.68	1.81	1.95	2.11	2.27	2.46	2.66	2.87	3.10
198	1.50	1.62	1.69	1.75	1.89	2.04	2.21	2.38	2.56	2.78	3.00	3.24
216	1.58	1.69	1.76	1.83	1.97	2.13	2.32	2.48	2.68	2.91	3.13	3.38
234	1.64	1.77	1.84	1.90	2.06	2.23	2.43	2.52	2.80	3.03	3.28	3.46
252	1.71	1.85	1.92	2.00	2.15	2.33	2.52	2.71	2.92	3.18	3.43	3.70
270	1.79	1.93	2.01	2.09	2.26	2.44	2.64	2.84	3.06	3.32	3.58	3.87
288	1.89	2.03	2.12	2.20	2.37	2.56	2.78	2.99	3.22	3.50	3.77	4.07
306	1.98	2.13	2.22	2.31	2.49	2.69	2.90	3.12	3.37	3.66	3.95	4.26
324	2.07	2.23	2.33	2.42	2.62	2.81	3.04	3.28	3.53	3.84	4.14	4.46
342	2.17	2.34	2.44	2.54	2.73	2.95	3.19	3.44	3.70	4.02	4.34	4.68
360	2.27	2.45	2.56	2.66	2.86	3.09	3.35	3.60	3.88	4.22	4.55	4.91
378	2.39	2.57	2.68	2.79	3.00	3.24	3.51	3.78	4.08	4.42	4.77	5.15
396	2.50	2.70	2.81	2.93	3.15	3.40	3.68	3.97	4.28	4.64	5.01	5.40
414	2.63	2.84	2.95	3.07	3.31	3.56	3.87	4.12	4.48	4.87	5.26	5.67
432	2.76	2.98	3.10	3.23	3.47	3.76	4.10	4.32	4.61	5.12	5.53	6.04

Where Does the Gas Go?

HOPE FINFROCK NORRIS, in the Woman's Home Companion for March, in an article discussing the use of gas in the home, summarizes as follows a variety of reasons why gas bills are sometimes high:

Because the housewife uses the giant burner on her range, when a smaller one would do.

She lights two burners at a time, and then lets one of them wait while she is getting food ready.

She takes food off the fire and leaves the burner lighted until she has time to put on a tea-kettle of dish water.

She buys all sorts of gas-saving devices, without finding out whether they really save gas, although the gas company would tell her.

She uses the gas oven to heat the kitchen and to dry damp clothes.

She uses her oven as a storage place for food, the moisture of which causes the oven to rust. Then she complains because the range lasts so short a time.

She allows water and foods to boil furiously, instead of turning down the flame.

She has her husband turn the gas part way off at the meter. This gives her a low pressure, and increases the length of time necessary for preparing the meal.

She uses a worn-out range, with burners out of adjustment. She does not know that the gas company would be glad to tell her what is the matter with her range.

She never cleans the burners of her range.

She uses her oven for baking, but does not plan to keep it full. She could plan baked potatoes or a casserole dinner for baking day.

She uses larger cooking utensils than she needs. In a set of triplicate saucepans she could cook three vegetables over one burner.

She uses open vessels, which consume five times as much gas as closed vessels of the same size.

She fails to report to the gas company when she gets a wasteful yellow flame.

She has never learned to read the gas meter.

As The Journal Views It

MUNICIPAL OWNERSHIP

The question is sometimes asked, "Can the public be fooled all the time?" It was historically answered in the negative by a great statesman. Sooner or later the people come to realize the real facts. However, it does appear as if it were possible to fool some of the public at any time that such a desire is created. It is well known how aspirants for political office promise the almost impossible in order to get votes, and when once elected promptly forget it all.

This is common practice, and recently it has been applied to the municipal ownership idea. As far as municipal ownership is concerned, some people will believe in it no matter how badly it fares in communities which adopt it. No matter what the results are, a good number of people can be still convinced that it is the cure-all of the public utility problem and that if the city or town owns the utility they can get gas for practically nothing or ride on the street cars without paying adequate fares.

It seems difficult to understand why this should be so, in view of the fact that many experiments of municipal ownership that have been tried in this country have almost invariably proven to be unsuccessful.

The most recent case is that of Long Beach, Cal. The newspapers of that town have been giving considerable attention to the municipal ownership campaign which has recently resulted in the citizens voting to issue bonds to acquire the gas properties.

During this campaign the promise was made that, when the municipality ran the gas plant, the charge for gas would be 50 cents per thousand cubic feet. This was one of the main arguments in favor of the city buying the gas works, in spite of the fact that it was pointed out that it would not be economically feasible to sell gas at such a figure and maintain the works in condition to give service. Within less than twenty-four hours after the control of the gas plant was acquired by the city the promise of 50-cent gas was broken and the rate was immediately established at 60 cents.

Loud were the protests of the citizens, but as loud as they were they were to no avail. Strange as it may appear, the argument was offered that the city could not carry out the necessary extension work under the proposed 50-cent rate.

Such are the vicissitudes of municipal ownership. All sorts of promises are made to the citizens and often believed by them, until they are broken. Then they find it is too late to do anything. Long Beach is simply experiencing now what other cities in this country have experienced in the past.

The price of gas will increase. The fact that it has already increased within twenty-four hours after the institution of municipal control simply goes to show that it does not take long for natural laws to exert themselves. Long Beach can take a lesson from Omaha, in which city the price of gas has nearly doubled since the municipality took over the gas plant.

The question naturally arises, why should this be so? Why should all this be necessary? Why should one community persist in attempting to do something which has been proven so many times to be impracticable and entirely contrary to American ideas of progress and development and freedom of industrial enterprise? Is it a question of the gas company and the other utility companies failing to present their case in the proper manner? It surely cannot be lack of interest, for the matter is of vital importance.

It is necessary for the people to be educated to the fallacies of municipal ownership. The arguments that can be presented are many. The examples that can be cited, in which complete failure resulted, are numerous. An effort must be made to direct these examples to the attention of every one concerned, so that further mistakes along these lines are avoided. It should be shown in plain facts and hard figures how unsatisfactory an undertaking municipal ownership is, and how the consumer will himself be the sole loser in the end.

It should be pointed out to him that municipal ownership is entirely against that exemplification of

American ideals upon which our great industrial success has been founded. He should be apprised of the essential character of private activity in any enterprise making for true progress and development. All this is a matter of education. It is only through education that the people can be taught to tell the difference between their true friends and those false aspirants to political favor, eager for public office. Those political bootlickers who use any argument and any means to secure their end. The people should be taught not to be fooled by specious arguments and empty words, the making of impossible promises. And it is the duty of the public utilities and their affiliated organizations to carry out such educational propaganda.

WHO SELLS THE GAS RANGES?

(Continued from page 570)

The Cooking School Demonstrations

There may be a cooking school, a domestic science class or club, or some other institution or organization in your town before which you can arrange to have a demonstration given that will give publicity to gas ranges. If you are located in an anthracite section, where nearly all homes have hard coal ranges, there is considerable educational work for you to do to show people the advantage of having a gas range as a sort of auxiliary cooking plant. It ought to be as easy to sell gas ranges to homes provided with gas as to sell them oil stoves, and oil stoves sell readily for auxiliary purposes.

A handsome gas range shown in the window can be made to attract the attention of housewives, and their attention can be held for a few minutes by the following scheme: From each part of the range run a string of red tape to a point where a slip of paper is pasted to the window glass. Each of these slips of paper bears an inscription that is a reminder of the advantage of that part of the range. The tape from the burners to the window strip leads one to the inscription, "Burners Fitted With Safety Lighters." Other strips call attention to "Full Porcelain Enamel," "Oven of Generous Size," "Cast Iron Oven Bottom—Will Not Rust Out," "Made With Ovens on Either Right or Left Side," "Legs Sturdy and Stiff—No Wabble," etc., etc. See that these slips are pasted on the glass at points that will bring them level with the eyes of a woman of average height as she stands outside.

The Prize Idea

The central station manager may find it good advertising to offer a prize for the best baking done on one of his ranges. This plan is easily carried out in connection with some church or charity sale. Just advertise that the prize will be given by the company for the best loaf of bread baked on one of your ranges and brought to the bake sale announced for a certain date. Or you might offer several prizes, one for bread, one for cake, one for cookies. The organization or institution holding the sale will appreciate this co-operation, which is sure to help them in making a financial success of the sale.

The Oil Stove in Exchange

If there are many homes in your city where kerosene stoves were used before gas was available, and if there still remain a considerable number of oil stoves in use, advertise an offer to accept these oil stoves in exchange for new gas ranges or heaters. Make an allowance that will seem liberal and that will attract people to make the deal, even though you are unable to get anything out of the old stoves that will recompense you. If you break even in getting a new gas range into a home in place of an oil stove, you make money in the end on the gas consumed. This plan will bring into line a good many new users.

The Warm Weather Argument

Of course, with the arrival of warm weather you again will feature the advantage of a gas range as a labor saver and as means of keeping the house cooler than is possible with a coal range. Don't wait for mid-summer and real hot weather for this sort of advertising. Start in early and urge people to buy gas ranges so they will have the benefit of them through the whole of the summer. In buying a thing of that sort for summer it is the same as in buying a summer suit of clothes. When the hot weather is well under way, it looks like only a little while until fall, and if it happens to be cool in the early part of the summer you lose some of your opportunity. Get busy early and make the sales early on the strength of the hot weather you are "going to have." No matter what the summer turns out to be like, in the spring you can advertise, "Get ready for the summer heat and avoid the terrors of the hot kitchen."

GAS FROM LIGNITE

German interests have undertaken the development of the lignite deposits in North Dakota for the production of manufactured gas and of a new kind of solid fuel said to be equal in firing efficiency to anthracite.

70,000 MILES OF GAS MAINS

The gas industry in the United States serves more than 4,600 cities, and its product goes through more than 70,000 miles of street mains, big and little. If all these pipes were laid end to end they would form a line long enough to go around the earth at the equator almost three times. Gas production in 1923 averaged about a billion cubic feet a day.

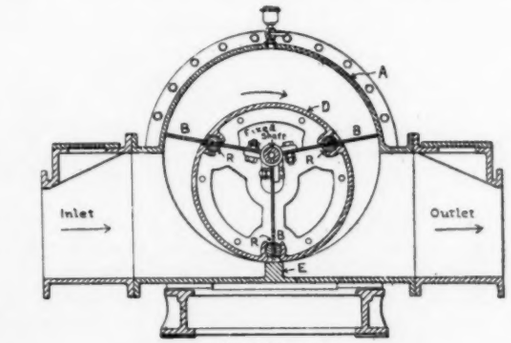
Catechism of Central Station Gas Engineering in the United States

Installment No. 25

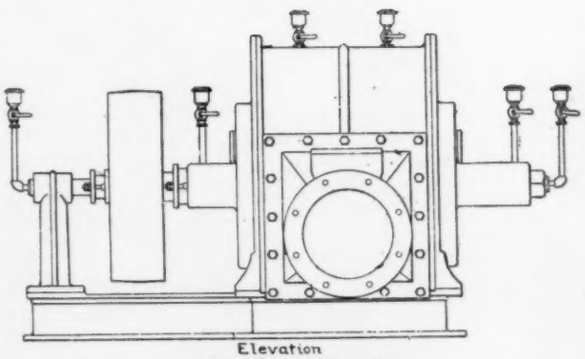
(Continued from last week)

The Mackenzie Exhauster

The length of the drum is such that there is just clearance at each end between it and the inside of the projections of the case (shown on the elevation), the inside diameter of these projections being only a small fraction of an inch larger than that of the drum. This is set with its center below that of the case, and its circumference tangent at the bottom to the rib E, running along the bottom of the case. It is rotated about its center by means of a



Cross Section.



Elevation

MACKENZIE EXHAUSTER.

hollow shaft projecting from one end, which shaft is turned by a belt pulley or direct from an engine on the same bed plate as the exhauster. Between the pulley and the drum the shaft is supported by a bearing cast on the case, and a similar shaft projects from the other end of the drum to support it by means of another bearing on that end of the case.

The blades B, B, B, are free to rotate around a fixed shaft, the axis of which coincides with the axis of the main cylinder of the case, and are of such size that the outer edges just clear the inner circumference of the case on top and the rib E on the bottom, while the ends just clear the inside of the end plates of the case. The shaft around which the blades rotate is bent down at each end, beyond the blades, and passes through the hollow shaft of the drum to an outboard bearing on the pulley end, while at the other end it projects just beyond the outside of the bearing in the case.

As the drum rotates, its circumference, at the points where the blades pass through it, is continually changing its position relatively to the blades, and the function of the rolls R, R, R, is to permit of a continual sliding motion at these points by rocking back and forth, in their bearings in the drum, so as to keep the slots through which the blades pass always in line with the blades.

The Action of the Exhauster

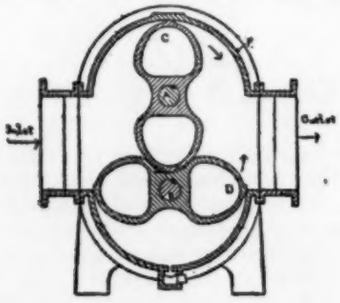
The action of the exhauster is as follows: The drum D, being rotated in the direction of the arrow, carries the blades B, B, B, with it, and these blades being practically in contact with the circumference and ends of the case, force the gas ahead and thus pass it from inlet to outlet. As the drum is practically in contact with the rib E, the gas driven forward on top cannot pass back on the bottom and must go out by the outlet.

By a study of the cross section it will be seen that in this, as in all similar forms of rotary exhausters, the space on the one side is continually increasing in volume, while that on the other is continually decreasing, thus drawing in gas on the one side, the inlet, and forcing it out on the other side, the outlet.

The Roots Exhauster

The Root exhauster is also a rotary positive exhauster. A vertical cross section is shown on the cut. F is a cast-iron case, consisting of two half cylinders, of equal diameter, separated by a rectangular prism, and with flat ends. The moving parts consist of the two impellers, C and D, keyed respectively to the shafts, A and B, and so set in the case that the axes of the corresponding shaft, impeller and half cylinder coincide. The impellers are so shaped that as they rotate each is always in contact, at some point, with the cylindrical portions of the case, and at the same time in contact with the other, while the ends are practically in contact with the ends of the case. The shafts are supported by bearings on the case, and connected with each other at each end by two gear wheels, one on each shaft, of the same diameter, and with an equal number of teeth, so that the relative position of the impellers is always the same, at the same point in any revolu-

tion. The lower shaft is extended at one end and provided with a belt pulley, or connected direct to an engine on the same bed plate as the exhauster.

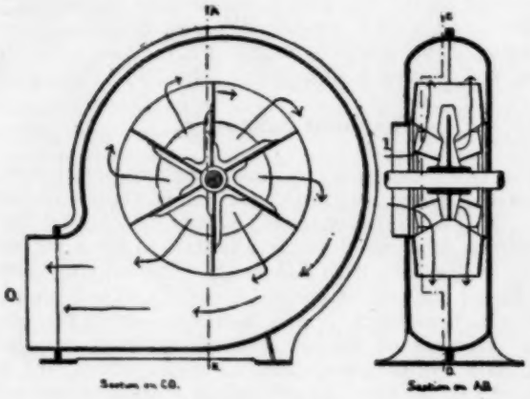


The Roots Exhauster

The action is as follows: Motion being imparted to shaft B, is transmitted through the gear wheels to shaft A, causing the two impellers to rotate, as shown by the arrows, and by the continual increase in volume of the space on the inlet side and decrease in volume of that on the outlet side, to draw the gas from the inlet and force it through the outlet, the contact between the impellers preventing the gas from passing back through the middle.

The Fan Exhauster

The Fan exhauster, although its moving parts rotate, is not included among the so-called rotary exhausters, this term being applied only to exhausters which impart motion to the gas by the alternate increase and decrease in the size of practically gas-tight spaces. The Fan exhauster consists of a fan wheel, composed of a number of blades extending radially from its axis and presenting practically flat surfaces to the air as they revolve, enclosed in a



The Fan Exhauster

case of much larger radius than the wheel. The wheel being revolved at high speed, sets in motion the gas within it, and by the centrifugal force so generated, delivers this gas tangentially at its outer circumference. There is thus formed a partial vacuum at the center of the wheel, which draws more gas through the axial inlet to be delivered at the circumference and through the outlet, which can be placed in any position on the circumference of the case.

The cut shows two sections of a Fan exhauster. The fan wheel being revolved in the direction shown, draws gas in through the inlet I and delivers it at the circumference of the wheel, from which it is guided by the case, to the outlet O, which, in this instance, is placed at the bottom of the case. The direction of travel of the gas is shown by the arrows.

Calculation of Horsepower of Exhauster

135. What horse-power is required for the actual work of pumping the gas by an exhauster handling 17,000 cubic feet of gas per hour with an inlet pressure of 1/10 in. and an outlet pressure of 12 in.?

Ans. The term "horse-power" as used to indicate the rate at which mechanical work is done denotes the performance of 33,000 foot pounds of work per minute, that is, the raising of a weight of 33,000 lbs. through a height of one foot, or the overcoming of a resistance of 33,000 lbs. through a space of one foot, or of any smaller resistance through a correspondingly greater space per minute. The horse-power required to pump gas can therefore be calculated by dividing the product of the resistance overcome and the space through which it is overcome in a minute, by 33,000, the resistance being measured in pounds per square foot and the space in feet. The resistance is determined by the net pressure against which the exhauster is working, that is, by the difference between the pressure at the outlet and that at the inlet of the exhauster. The space can be taken as the number of cubic feet of gas pumped in a minute without any reference to the actual velocity with which the gas passes through the outlet pipe, since with a given outlet pressure the total resistance against which the exhauster is working varies directly as the area of the outlet pipe, while the velocity of the gas, or the space passed through in the unit of time varies, when the same quantity is pumped per minute, inversely as the area of this outlet pipe, and therefore the product of the total resistance and the space passed through will always be equal to the product obtained by multiplying the resistance per square foot by the number of cubic feet of gas pumped in the unit of time. The pressure is usually given in terms of the height, in inches, of the column of water which it will balance, and to convert this to pounds per square foot it is necessary to multiply it by the weight of a column of water one square foot in area and one inch high. A cubic foot of water weighs 62.5 lbs., so a column of water 12 in. high exerts a pressure of 62.5 lbs. per square foot, and a column 1 in. high will exert a pressure of $62.5 \div 12 = 5.2$ lbs. per square foot.

Formula Used in Calculation

The horse-power required for the actual work of pumping the gas can therefore be determined by multiplying the number of cubic feet pumped per

minute by the product obtained by multiplying the net pressure in inches of water by 5.2 (which gives the pressure in pounds per square foot against which the exhauster is working) and dividing the final product by 33,000. Putting this rule into the shape of a formula we have:

$$\text{H. P.} = \frac{VH \times 5.2}{33{,}000}, \text{ in which}$$

V = number of cubic feet of gas pumped per minute, and

H = the difference between the outlet and inlet pressures in inches of water.

In the present problem

$$V = \frac{17000}{60} = 283.33, \text{ and}$$

H = 12 in. — 0.1 in. = 11.9 in., so

$$\text{H. P.} = \frac{283.33 \times 11.9 \times 5.2}{33000} = \frac{283.33 \times 61.88}{33000} = \frac{17532.46}{33000} = 0.531,$$

and therefore the horse-power required for pumping the gas, without taking into consideration the friction of the exhauster, or any other losses of power in the machinery, is 0.531 horse-power.

Formula for Determining Total Horsepower

From the information obtained by a series of tests made on exhausters pumping gas into outlying holders, in which tests the amount of gas pumped, the pressure against which it was pumped and the horsepower developed in the engines doing the work were all determined, Mr. Geo. J. Roberts works out the following formula to be used in determining the total horse-power required in any given case when the gas is to be handled with an exhauster of the Wilbraham type.

H. P. = 0.00511 × H × V, in which

H = the net pressure in inches pumped against,

V = thousands of cubic feet pumped per hour.

Substituting the values of H and V in the present problem we have:

H. P. = 0.00511 × 11.9 × 17 = 1.03.

So that the total horse-power required according to this formula is nearly double that required for pumping the gas. Or, in other words, the efficiency of the engine and exhauster when working at this rate is only about 50 per cent.

Governing Speed of Exhauster

136. Should the speed of an exhauster used for the purpose of relieving the retorts of a coal gas plant from the pressure thrown by the rest of the apparatus be governed in the same way as the speed of an exhauster used for drawing gas from the relief holder of a carburetted water gas plant and forcing it through the rest of the apparatus? Give the reasons for your answer.

Ans. The speed of a coal gas exhauster should not be governed in the same way as that of an exhauster drawing gas from the relief holder of a carburetted water gas plant, since the two exhausters perform entirely different duties.

That of the coal gas exhauster is to relieve the retorts of the pressure thrown by the rest of the apparatus and to maintain a constant low pressure in the hydraulic main. To do this the gas must be drawn away at exactly the rate at which it is being made at any instant, and as the gas is not made at a uniform rate it is impossible for the coal gas exhauster to run at a uniform speed if it is to perform its duty properly. Its speed must therefore be governed in such a way as to be increased as the rate at which the gas is made increases, and to be decreased as the rate at which gas is made decreases. In this way the pressure at the inlet of the exhauster, and consequently in the hydraulic main, is kept constant.

Constant Speed Must Be Maintained

The sole object of the exhauster in a carburetted water gas plant is to force the gas through the purifiers and station meters into the holders, the pressure thrown by the relief holder being, as a rule, insufficient for this work. Since the relief holder compensates for the inequalities in the rate of make, this exhauster can be, and is, run at a uniform speed such that it will handle the gas at a rate equal to the average rate of make, and it must therefore be governed in such a way as to maintain a constant speed, this being varied from time to time to suit the requirements of production.

Types of Condensers Used in Coal Gas Manufacture

137. Give a description, illustrated with sketches, of one or more forms of the condensers used for cooling illuminating gas during the process of manufacture.

Ans. One of the earliest and simplest forms of condensers used for cooling illuminating gas during the process of manufacture is composed of ordinary cast iron pipes inclined at a small angle to the horizontal, and fastened to the side of a wall in such a way that the pipes zigzag back and forth until the ground line is reached. The gas passes through these pipes and radiates its heat into the air, until it is cooled down to the temperature of the atmosphere. This form has been elaborated into what is known as the flat screw condenser, in which the inclined pipes are in double tiers and are mounted on frames or standards.

Simple Form of Atmospheric Condenser

Another simple form of atmospheric condenser is composed of vertical pipes mounted on a cast iron box. The pipes are connected together at the top, in pairs, by return bends provided with cleaning holes, and in the box, partitions sealed in the liquids con-

densed from the gas are placed between the pipes joined together by the bends, there being one partition for each pair of pipes. The box is thus divided into compartments into each of which open two pipes which are not connected together at the top. At each end is a single pipe opening into a compartment of the box, into which also opens one pipe of a set of two connected at the top. By this arrangement the gas entering at the top of the single pipe at one end passes down into the box and then up and down the pipes alternately until it passes out at the top of the single pipe at the other end of the apparatus.

This condenser has also been elaborated from the simple form containing only a single row of pipes into a condenser containing several parallel rows, the top connection between the pipes being made by properly placed hoods sealed in liquor, the box and partitions at the bottom being substantially the same as in the simple form.

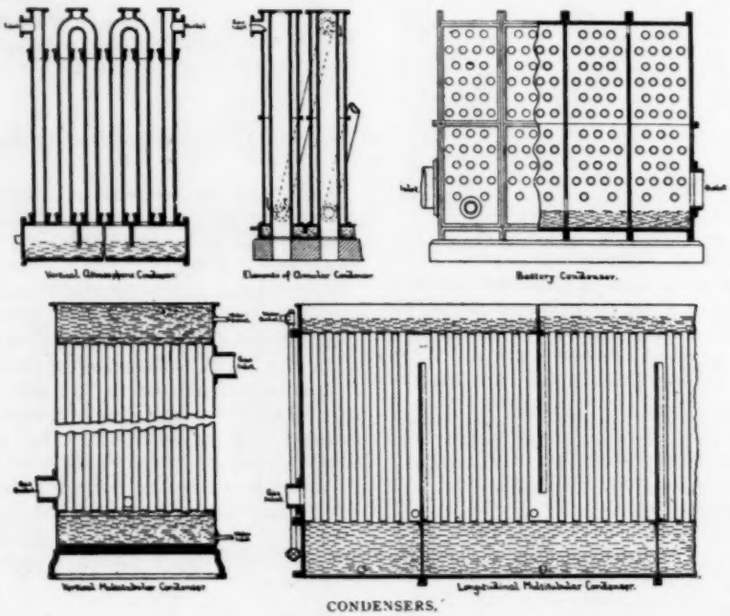
The Annular Condenser

Another vertical atmospheric condenser is the annular condenser, which consists of a series of large pipes, through the center of each of which passes a smaller pipe, open to the air at both top and bottom. The gas travels through the annular space between the pipes and imparts its heat to a current of air induced through the center as well as to the air on the outside of the pipe, the radiating surface being thus nearly doubled. The annular space in one pipe is connected to that of the next by a smaller outside pipe, or pipes, which conveys the gas from the top of one space to the bottom of the next, or vice versa, or else this space is divided into two parts by vertical ribs extending almost the whole length of the pipes, so that the gas passes up on one side and down on the other, and the spaces are connected by short pipes running from the bottom of one to the bottom of the next. If the ribs are arranged to make the gas travel first down and then up, the spaces are connected together at the top instead of at the bottom.

The Battery Condenser

Still another form of atmospheric condenser is that known as the battery condenser. This is an oblong box from 2 ft. to 5 ft. wide, 10 ft. to 18 ft. high and of varying length. It is divided internally into compartments by means of partitions, leaving openings alternately at the top and bottom, so that the gas entering at the bottom of the first compartment is forced to travel up in this and down in the next until it passes out at the bottom of the last compartment. Tubes 2 in. in diameter, with both ends open to the air, are run horizontally across the compartments, and the currents of air passing through these assist in cooling the gas. In both the annular and the battery condensers arrangements are made for regulating, in one case the size, and in the other the number, of the openings for the admission of air, in accordance with the temperature of the air and gas at different times.

Atmospheric condensers of one or another of these types are practically the only condensers used in England, but in this country it is considered better practice to employ condensers in which the cooling of the gas is effected by imparting its heat to water. The usual form of such condensers is the ordinary vertical multitubular type. This consists of a cylindrical wrought iron or steel shell from 2 ft. to 10 ft. in diameter, and from 12 ft. to 20 ft. high, closed at the bottom by a cast iron base plate and at the top by a plate of the same material as the shell.



CONDENSERS.

(Twenty-sixth Installment Next Week)

employees of these utilities were out in the storm repairing damage caused by it, almost as fast as the damage occurred. Because these men were reliable and faithful to an extreme degree, the public suffered little inconvenience. Instances of the spirit with which employees in other utilities meet and overcome similar crises might be cited.

Most troubles between the public and the public utility may be traced directly to employees of the utility. The public judges the utility quite properly by the treatment which it receives from employees of the utility. It is extremely important, therefore, that employees be selected with the thought in mind that they can qualify as proper representatives of a public utility devoted to the cause of furnishing absolutely necessary service to the public. Someone has said:

"A man who has a thousand friends
Has not a friend to spare,
But he who has an enemy
Will find him everywhere."

This is as true of public utilities as it is of individuals, and perhaps more so. The man or woman who lacks the natural courtesy and kindliness of the true gentleman or lady has no place on the payroll of a public utility. No matter how good or worthy an employee may otherwise be, his lack of courtesy should forever bar him or her from advancement, and, as speedily as possible, he should be replaced.

Thoroughness

Victor G. Herbert

IF YOU want to enjoy any work which you may desire to undertake, it will be absolutely necessary for you to be thorough. Anything short of this means a poor job—and no one can possibly take pleasure in work of any kind which is shabbily done.

Besides, the penalty of the lazy man is that lack of thoroughness condemns him to do the task over and over in one form or another, and from first to last he must put up with indifferent and makeshift conditions.

Thoroughness pays big dividends in labor saving, in satisfaction, and in the training which it gives for greater responsibility. Thoroughness means interest and increased efficiency.

Most of us are inclined to think of thoroughness as something strenuous, and so to be dreaded—but it is nothing of the kind. Thoroughness is really an attitude of mind. It means being mentally prepared at every point to make real effort.

This means that a thorough job calls for careful plans. A surprising number of people start out and do important things without making those plans which will insure success. It is childish and foolish to expect fine results without taking time to lay the proper foundation. Know what you are going to do and how you are going to do it.

Then it is very necessary to make proper preparations. There are people who will start on an automobile trip and think it sufficient to fill the machine with gas and oil; others will take pains a couple of days ahead of time to see to it that the springs are greased, the cylinders ground and the carbon removed, everything tightened, and the whole machine ship-shape.

It is unnecessary to discuss who will "get there" with the least trouble, and whose machine will last the longest.

Getting started in good season is an important element in thoroughness. Many a job is poor because it is hurried. Hurried work may be well done but it seldom is. When we are looking ahead and estimating as to how long a job will take, we are almost certain to think that it can be done quickly. But thoroughness is sure to call for a little more pains here and extra effort there until more hours have been consumed than we expect. Allow for this in planning ahead.

Then there are many people who think that small details can be slighted, because certain parts of the work will not show; or, as they say, "This is good enough and better than many people would do it!"

But thoroughness calls for thoroughness in all parts which are out of sight as well as in sight. Give every detail of the work careful and skilful attention. If the task is worth undertaking it is worth doing well.

A great many people begin a piece of work well and follow it up intelligently, yet fall down in the doing of the last part of the task. It is really the rare individual who finishes a job to the very end—ties up all the loose threads and fastens the knots.

Business executives and teachers frequently remark that success in life is undermined for many a student, many a housekeeper, and many a business man because of lack of thoroughness in finishing tasks up well. So it is important that young people be trained in thoroughness in order that they may be the right sort of citizens.

Follow-up work is often important in conserving expense and energy already expended. A house may be well built, but it must be kept in repair. A fine purchase may be made, but the article must be taken care of.

Thoroughness is what marks the difference between the cheap, sloppy worker and the high-priced, skilful one—between the expert and the individual who is always grumbling that luck is against him.

THE FUEL OF THE FUTURE—WHAT SHALL IT BE?

(Continued from page 566)

in diameter. The third and fifth layers are then made with arches while the fourth and sixth layers are made of flat tiles. The baffle is built up in this manner until the proper height is attained. With a construction of this kind, arranged with similar care, very effective results are obtained for the hot gases are forced to pass through many passages and their time of contact with the brick-work is sufficiently prolonged for them to give up a goodly portion of their heat content.

Air Required for Combustion

The air that is required for combustion is admitted into the burners in the usual manner. Care must be taken to see not only that sufficient air is present to produce complete combustion of the gas, but that too much air does not enter. For a great excess of air means a direct loss of heat. The air thus introduced into the combustion chamber of the furnace will be heated up by the products of combustion and will pass out of the furnace in conjunction with the flue gases.

Dampers must be provided to avoid any air leaking into the combustion chamber when the burner is cut off and cooling off the checker-work with direct loss of heat. On the other hand, there must be enough air admitted into the furnace to allow the pilot light to burn. The admission of this air is carried out independently. A certain amount of secondary air, air that is admitted into the furnace not previously mixed with gas, is necessary, and quoting again from the Denver tests, it was found that approximately 25 to 40 per cent over-ventilation gave satisfactory results with special gas-designed furnaces, while from 40 to 55 per cent was required in converted furnaces. Under normal conditions the loss of heat in the stack gases is 12 per cent in the case of boilers and furnaces that are designed especially for the combustion of gaseous fuel. On the other hand, in the case of the hot air furnace and converted installations, the heat loss in the flue gases is on the average 15 per cent.

The Use of an Economizer

In the reports that have been made on the house heating experiment which was carried on in Denver and which has passed out of the experimental stage, for some time past (we wish to acknowledge our indebtedness to these reports), it was recommended that an economizer be installed between the outlet of the furnace and the chimney. The use of the economizer is particularly important in hot air heating systems, for the interchange of heat between the hot combustion gases and air, which then circulates through the house and emerges from the registers to effect its heating action in the various rooms of the house, takes place in such a manner that all the heat in the hot combustion gases has not a chance to be transferred to the heating air. The result is that even when the conditions are most carefully controlled in the furnace and even when the design of the furnace is carried out in such a manner that its construction is eminently favorable for burning gaseous fuel and utilizing the heat contained in the gases of combustion obtained in the burning process, nevertheless there is still an appreciable amount of heat left in the flue gases as they emerge from the furnace. If there are no means at hand for saving a portion of this heat and diverting it into useful channels, then it is entirely lost in passing up the chimney and out into the external air.

The Importance of the Economizer

The importance of the economizer is clearly evident to the industrial gas engineer, for he must use his fuel, gas, which is higher in price than the other common fuels used in house heating practice, with the highest degree of economy and efficiency. He cannot afford to allow any opportunity to slip by for improving the thermal conditions under which gas is used in house heating systems. The extra expense which the house-owner may incur, due to the inclusion of the economizer in his heating plant, is soon compensated for by the greater economy gained with the use of the fuel.

Construction and Effect of the Economizer

The economizer is constructed of a number of cast iron radiator sections. Cast iron is employed for there will be a certain amount of condensate collected in the economizer, due to the condensation of the water vapor which is always present in the gases of combustion from the combustion of hydrogen present in the gas either in combined or free condition. When cast iron is used there is no danger from corrosion of the metallic parts of the economizer. It is well to provide a drip for removal of the water collected in the apparatus.

There are two passages provided from the furnace to the chimney, so that the hot gases can either pass through the economizer or be shunted off and pass directly into the chimney. Such an arrangement, which also includes a thermostat-controlled damper in the pipe leading from the economizer to the chimney, is necessary for the reason that if the gases of combustion are cooled down too much before they enter the chimney, the natural draft, which is created by the chimny and which is required to secure proper combustion conditions in the furnace, will be destroyed. Hence, the thermostat is set at such a position that it shuts off the passage of the gases of combustion through the economizer and bypasses them directly into the chimney, when their temperature is reduced to the minimum point at which proper draft conditions can be maintained in the chimney.

The economizer heats an independent supply of

air up to the desired temperature. The outlet of this heated air from the economizer can be arranged so that the hot air is directly discharged through a register into the rooms above, or else it is possible to arrange the installation so that the hot air mixes with the other hot air that comes from the main furnace.

Importance of the Economizer in Converted Installations

The use of the economizer may be even more important with a converted hot air furnace than with a furnace which has been especially designed for use with gas. In the latter case it may even be possible to do away with the economizer altogether, but it would appear as if better results would be obtained by its use, no matter how well the hot air gas-fired furnace is designed. The economizer has no place in a hot water or steam installation. And this is one of the reasons why the hot air system is so particularly well suited for firing with gaseous fuel.

Making Other Conversions

It is, of course, also necessary to convert steam and hot water boilers into gas-fired apparatus. Generally the matter is a little more difficult to accomplish than the conversion of the hot air furnace. The water coils in the boiler are commonly arranged in such a position that they would be in the way of the baffling arrangement that has to be built into the boiler when gas is employed as the fuel. This would necessitate the removal of the water coils and their relocation at a more advantageous and convenient point. It has been suggested that the coils may be located within the flue leading from the boiler to the chimney. Such an arrangement of water coils might also be used as an auxiliary system to the main heating coils, so that the cold water that enters the boiler will first pass through these coils and be preheated, thus effecting a partial saving of the heat that goes up the chimney. Similar care must be taken in converting a coal-fired hot water boiler into one fired with gas. There are to be sure certain difficulties present, but these are not unsurmountable and the results obtained will be very satisfactory to the consumer if the problems are attacked in a scientific manner and if the conversions are made with due consideration of thermal efficiency and the attainment of satisfactory economy.

Cost of House Heating With Gas and With Coal

Figures have been published showing the relative costs of coal and gas for house heating. The figures given below are taken from the Denver house heating report and are based on an average price of coal of .. per ton and an average price of gas of .. B.t.u. thermal standard of .. per cubic foot. The cost of heating with gas per million B.t.u. of heat put into the system averaged around $1.56, while the cost of heating with coal was found to be about 50 cents per million B.t.u. of heat. This is not an entirely equitable comparison, for it presupposes the same efficiency of heat utilization with coal as with heat. As has been pointed out in an early article in this series, this is not the case, and hence when figuring the cost of heating with coal in different heating systems on the basis of replacing one million B.t.u. produced by burning gas, the cost figures became 95 cents on the average for coal burned in a hot air furnace, 84 cents for coal burned in converted furnaces and 81 cents for coal burned in gas boilers, or an average of 89 cents for coal against $1.56 for gas. This, then, means that gas is almost twice as expensive as coal for house heating purposes.

Of course, this comparison is not complete unless there is included the savings that are effected in using gas due to the elimination of janitor charges, charges for the removal of ashes, etc. In some cases where a janitor is especially employed for looking after the heating system, the difference between coal and gas is very slight. Then, again, it must not be forgotten that there are very important though intangible savings effected in fuel, due to the greater cleanliness, economy of space, ease of control, constancy of temperature, better sanitary conditions that are attained when gas replaces coal as the house heating fuel.

The Physiological Aspect of House Heating

The industrial gas engineers should be cognizant of the general physiological conditions of house heating as well as the economic and technical aspects of the problem. House heating is closely connected with ventilation. In fact, the two are direct corollaries of each other and it is impossible to consider one without keeping the other in mind as well. Ventilation is an important factor in heating hygiene and is but one of the physiological questions that are involved in this matter. The others are the regulation of the humidity of the air within the heated rooms of the house, and the constancy of the temperature within these rooms.

The Ventilation of the House

Ventilation of the home is important, if not as important as the ventilation of large auditoriums, schools, churches and other places wherein large numbers of people congregate. In these cases special ventilation systems must be provided, but in the average home the ventilation of the rooms during the winter time is primarily effected by the difference in temperature between the hot air of the room and the cold air on the outside, which is drawn into the house through cracks and joints between windows and doors. There is no question that fresh air is just as necessary in the winter time as in the summer time, if not more so, and the average steam-heated house or apartment does not get the necessary fresh air to keep the rooms properly ventilated.

Here is where the industrial gas engineer can be an aid in advising the house owner regarding the

kind of heating system to install. If good ventilation is wanted, ventilation that automatically takes care of itself, the hot air system is recommended. The continual flow of freshly heated air serves not only to heat the house, but to ventilate it as well. This marks one of the main advantages of this system.

Humidity of the Air

Another very important point from the standpoint of heating hygiene is the degree of humidity in the heated air. The air in the average house heated by steam or hot water is excessively dry, for the dew-point of the air is raised by the high temperature of the same, with the result that the hot dry air dries out everything it comes in contact with. Whatever is in the room is subjected to this drying process and in certain cases, as furniture, piano, etc., the effect is deleterious. But it is also harmful to the people who live in the house. It promotes the tendency of the mucous membranes of the nose, eye and throat to catch cold and it is a fact that physicians are agreed that people who are subjected to the dry atmosphere of the average heated house or apartment during the winter time are easily apt to catch cold. The one way to get around this difficulty is to provide suitable humidifying devices in the heated rooms of the house. This need be done only in the case of hot water and steam heating. In the case of hot air heating the air itself is moistened by coming in contact with a body of water in a container which is provided for in building the furnace. Humidifying apparatus of various sorts are on the market and can be used when the other heating systems are employed. A common practice is to place a pan of water on the radiator, and while this is a crude method it is far better than nothing at all. The gas engineer in dealing with house heating business should always bear in mind the great importance of maintaining the proper humidity in the air of heated rooms. By emphasizing the importance of this matter, he will be performing signal service to his customer.

The Constancy of Temperature

Physicians will also confirm the fact that constancy of temperature in the different rooms of the house and at all times during the heating season is very conducive to keeping the people free from colds. It is not the fact that the temperature is too low or too high in the rooms, but that it varies, that makes people liable to catch colds. The important thing is to maintain the temperature constant. If that is done, one great cause of colds is removed.

It is evident that gas offers the greatest ease of control of temperature in the heated house when this fuel is burned in the furnace. Any temperature at all can be obtained and maintained without difficulty. Such ease of control is not afforded by any of the other fuels that are commonly used in heating houses, least of all by coal, either soft or hard. The gas engineer must bear in mind that in this case his fuel has a very decided advantage over all the others in this competitive field.

THE ROTARY HIGH PRESSURE BLOWER AND GAS PUMP

(Continued from page 577)

grain and other granular materials by pneumatic systems. In meeting these demands it was first attempted to handle the higher pressures with the regular low pressure blower, arranged with larger prime movers.

Special High Pressure Machinery Had to Be Designed

It was discovered, however, that the low pressure line of units were too light, and this led to the design of special apparatus. While pressures of two or three pounds were successfully met with our low pressure construction, in the case of pressures as high as eight or ten pounds new construction, which naturally included much larger shafts, longer bearings, wider face for gears and heavy sections for impellers and cases, was provided.

Use of a Water Spray

At the time high pressure units were first used it was thought necessary to provide some special means of cooling to reduce the temperature which was caused by compression. The device which is most generally used consisted of a water spray with

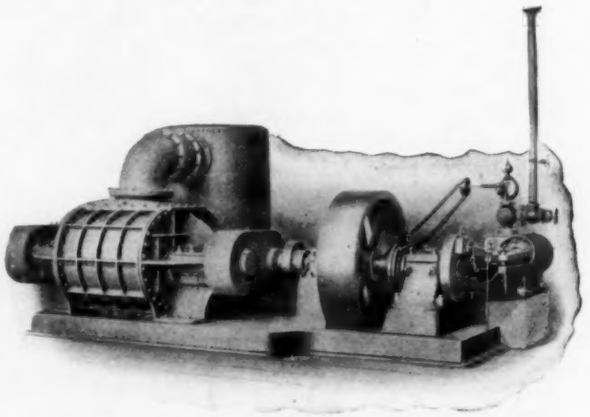


Figure 1

a separating tank similar to the illustration in Fig. 1. This device, in addition to absorption of heat, also served the purpose of sealing the clearances with a resulting higher volumetric efficiency. The water spray and separator were finally abandoned, because it was found that the gas absorbed too much moisture in passing through the booster and separator, even though exceptionally large and well designed separators were used.

Current Market Prices

COALS (By Courtesy of Coal Age)

A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64		
(Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	(*)
Kanawha mine run	Columbus	(*)
West Virginia lump	Cincinnati	2.00 to 2.25
W. Virginia gas mine run	Cincinnati	1.25 to 1.50
Midwest		
Indiana 4th vein lump	Chicago	2.75 to 3.00
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.90 to 3.10
Big Seam mine run	Birmingham	1.75 to 2.00
Southeast Kentucky lump	Louisville	2.00 to 2.35
Southeast Kentucky mine run	Louisville	1.25 to 1.75

B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

Market	Freight rates	Independent	Company
Egg New York	$2.34	$8.75 to $9.25	$8.45 to $8.85
Egg Philadelphia	2.39	8.80 to 9.60	8.80 to 8.85
Egg Chicago (net tons)	5.06	7.86 to 8.00	7.83 to 7.90

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.20 to $3.25
Wise County, furnace	3.75 to 4.50
Alabama, furnace	5.00 to 5.50
Foundry, Newark, N. J., del.	10.41
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	12.50
Foundry, Granite City, Ill.	12.50
Foundry, Alabama	6.00 to 6.50

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	$1.95
Corning, Ohio	2.15
Lima	2.28
Pennsylvania	3.75 to 4.25
Wooster, Ohio	2.15
Indiana—Illinois.	
Illinois	2.07
Indiana	2.08
Oklahoma—Kansas.	
Healdton	.90
Mid-continent (low gravity)	.90 to 1.05

* No quotation, due to strike.

Gulf Coast.

Gulf Coast, Grade A	$2.00
Gulf Coast, Grade B	1.70

GAS OILS.

Gas Oil, Bayonne, bulk gal.	5¼ to 6c
Gas Oil (32-36) Illinois-Indiana,	4.68 to 4.93
Gas Oil (32-36) Oklahoma, gal.	2¾ to 3 c
Gas Oil (32-36) Gulf Coast, gal	5 to 5½c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$64.20 to $65.20
Six-inch and over, Chicago	60.20 to 61.20
Four-inch, Birmingham	57.00 to 58.00
Six-inch and over, Birmingham	53.00 to 54.00
Four-inch, New York	70.60 to 71.60
Six-inch and over, New York	65.60 to 66.60
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; Reporter)
4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb.	5 to 5¼c
Ammonia aqua, 20 deg. drums lb.	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb.	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk F. O. B. Works, per 100 lbs.	$2.60 to $2.65
Potash prussiate, yellow casks, lb.	18½ to 19 c
Potash prussiate, red casks, lb.	35 to 37 c
Soda prussiate, yellow casks,	10½ to 11 c
Soda sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

Benzol C. P. tanks, works, gal.	24 to 25c
Benzol, drums, gal.	30c
Benzol, 90% tanks, works, gal.	23c
Benzol, 90% drums, gal.	28c
Napthalene, flake, barrels, lb.	5 to 5½c
Napthalene, dyestuff bags, lb.	4¾ to 5 c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal.	29 to 30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal.	36c

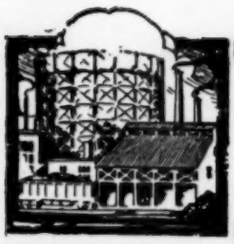
Petroleum

Conditions in the petroleum products market were largely in favor of the buyer throughout the week, and the situation was much the same in the crude oil trade. One reduction in posted prices of crude oil was made, while numerous cuts in refined products were reported from various sections of the country.

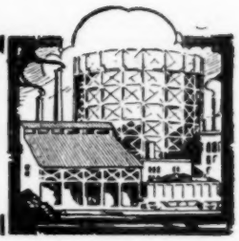
Production of crude oil for the entire United States for the week ended June 7 was 92,450 barrels a day less than that a year ago, the total being 1,983,100 barrels daily average for the week ended June 7, against 2,076,800 for the corresponding week in 1923. According to producers and refiners, the small current increase of 400 barrels a day in average production for the week ended June 7 indicates that the situation is being brought under control, and with the anticipated increase in gasoline demand during the next few weeks, the hope that the stability of the market will be restored is being expressed.

Gas Oil

Gas oil was slow and easy, the market at Bayonne refineries ranging 5¼c to 6c per gallon in bulk. Gas oil was also weaker at Midcontinent refinery points.



NEWS OF THE GAS INDUSTRY



U. S. Supreme Court Upholds Gas Company

San Francisco — The United States Supreme Court in Washington has decided in favor of the Pacific Gas & Electric Company of San Francisco in its suit to overthrow the gas rates set by the local Board of Supervisors for the years 1913, 1914, 1915 and 1916.

Lower courts had held the ordinances valid and ordered the company to repay consumers' overcharges amounting to more than $2,000,000. In reversing the decision of the lower courts, the Supreme Court held that the rate of 75 cents per 1,000 cubic feet had been unreasonable, according to press dispatches.

It was pointed out that the court below failed to take into consideration the value of certain patents that caused a large amount of the company's property to become obsolete.

The litigation began in 1913, when the Pacific Gas & Electric Company filed three suits contending that the 75-cent rate was confiscatory and the ordinances illegal. These suits were consolidated in 1916 and went to trial in the Federal court.

An injunction permitting the company to charge the 85-cent rate pending the outcome of the suit was obtained, with the provision that the company give bond for and refund the difference with 7 per cent interest in case the city ordinances were upheld.

In delivering the opinion Justice McReynolds said that the court would leave for future consideration the subject of how the company should be compensated. Dissenting opinions were filed by Justices Brandeis and Holmes.

GAS RATES INCREASED

Canandaigua, N. Y. — Public Service Commission has granted the increase in gas rates sought here by the Rochester Gas & Electric Corporation, and has also established a 537 B.t.u. standard, as sought by the corporation.

New rates, effective May 20, for gas supplied to Canandaigua residents, are as follows: First 100 cubic feet, 60 cents; next 4,900 cubic feet, $1.60 per thousand; next 5,000 cubic feet, $1.40; over 10,000 cubic feet, $1.30; minimum monthly charge, 60 cents.

City Attorney Fred D. Cribb indicated no further effort would be made to fight the increase. Two hearings were conducted here by Commissioner Charles VanVoorhis, at which it was shown that in 1923 the corporation received from its gas sales in this city $56,195, while its operating expenses were $63,718, or a deficit of $7,522. According to the ruling of the commission, the 6 per cent return asked is lower than that usually allowed by commissions and courts.

Gas Man Honored

Bridgeport, Conn.—George S. Hawley, vice-president of the Bridgeport Gas Light Co., has been re-elected chairman of the Central Council of Social Agencies of Connecticut. The Central Council of Social Agencies controls all of the social and welfare work in the State of Connecticut.

New England Guild of Gas Managers Holds Outing

The annual outing of the New England Guild of Gas Managers was held at the Vesper Country Club, Lowell, Mass., on Tuesday, June 3.

The gathering was entirely informal, as is customary with this organization.

A golf tournament was participated in by most of those present. The matches and scores proved very interesting. Mr. A. F. Shaw, treasurer of the Providence Gas Company, was the winner, with a net score of 70. The kicker's handicap resulted in a tie between F. C. Freeman and J. A. Taussig.

The American Gas Association was represented by J. B. Klumpp, president, D. J. Collins and J. H. Taussig. The Guild was very glad to have these men as their guests at this outing.

A feature of the day was the spirited tennis match between Messrs. Pritchard and Cheney.

A bountiful luncheon was served to the forty-five members present and the entire arrangements were in charge of Messrs. W. F. Norton, Capt. A. F. Cooper and Francis E. Drake, secretary of the Guild.

The members of the Guild all agreed that this was one of the best outings ever conducted by the New England Guild of Gas Managers.

Charles W. Wardell, Long Connected With Welsbach Co., Resigns

Charles W. Wardell, for the past 17 years connected with the home office of the Welsbach Company in sales and advertising departments, and widely known on account of his activities in gas association work, has resigned from the Welsbach Company and has organized the Eastern States Appliance Company, with offices at 2405 Chestnut street, Philadelphia, Pa. Branches will be established in other cities later on.

Mr. Wardell and his associates are well known in both the gas and electric industry. At present Mr. Wardell is active on several committees of the American Gas Association, a director of the Mutual Gas Supply Men's Association and a director of the New Jersey Gas Association.

The Eastern States Appliance Company, of which Mr. Wardell is manager, will act as manufacturers' distributors to the trade throughout the Eastern States from New York to Florida. "Products of Merit" is the slogan of the new company.

Several lines have already been secured. Others are being considered. Mr. Wardell has the good wishes of his legion of friends in his new venture.

Public Service Commission Approves New Rates

Albany, N. Y.—New rates for gas and electricity approved by the Public Service Commission will be put into effect June 1 by the Empire Gas & Electric Company in Auburn, Geneva, Seneca Falls, Waterloo, Phelps and Newark, N. Y. The new gas rates will be: First 100 cubic feet, 50 cents; next 19,900 cubic feet, 13.5 cents a hundred cubic feet.

Existing rates are: First 1,000 cubic feet, 17.5 cents 100 cubic feet, with a reduced rate for larger consumption. The reduction effected applies to all consumption of gas up to 20,000 cubic feet.

Discount Arrangement Suspended

Albany, N. Y.—The Public Service Commission today suspended a new tariff of the Mountain Gas Company, operating in Saranac Lake, under which certain changes were proposed in its discounts for prompt payment for gas consumed, the Commission holding that the practice contemplated tended towards discrimination. The company now allows a discount of 15 cents a thousand for the first 3,000 cubic feet and 30 cents a thousand for over 3,000 cubic feet of gas consumed.

The company proposed to establish a new schedule under which there would be a discount of 15 cents a thousand feet for the first 3,000 cubic feet; 30 cents for 3,000 cubic feet to 10,000 cubic feet and $1.15 a thousand for all gas sold over 10,000 cubic feet. The discount provision calls for payment within ten days of rendering the bill.

H. M. Byllesby & Co. Announces Dividends

H. M. Byllesby & Co. announces that the boards of directors of the following companies have declared the regular quarterly dividends on their respective shares:

Southern Colorado Power Company, 1¾ per cent on the preferred stock, payable June 14, to stockholders of record May 31.

Oklahoma Gas & Electric Company, 1¾ per cent on the preferred stock, payable June 14, to stockholders of record May 31.

Gas Company to Make Extensive Improvements

Anaheim, Cal.—Including the proposed installation of approximately 50,000 feet of main from Santa Ana to Huntington Beach, at a cost of nearly $100,000, the 1924 budget of Orange County expenditures proposed by the Southern Counties Gas Company was made public by J. C. Hayden, local manager of the utility.

The budget for Orange County, totaling $204,826, is as follows:

Laying of 49,000 feet of 8-inch cast iron transmission line from Santa Ana to Huntington Beach, $98,000.

Betterments and replacements called for because of paving operations: In Santa Ana, $50,000; Orange, $6,000; Anaheim, $25,000; Fullerton, $15,000; and Placentia, $5,000, or a total of $101,000 in this group.

Installation of 3,500 feet of three-inch line on the Winterburg road, $2,625—work made necessary because of the bad condition of the existing two-inch main.

Installation of a small improvement in the Carbon canyon line, $576.

Installation of a replacement of 3,500 feet of three-inch main on West Ocean avenue, Garden Grove, necessary owing to bad condition of the existing main, $2,625.

This makes a total of $204,826 for the program of improvements outlined to be done in the county during the year.

"In our entire system in the Southland," said Hayden, "our total expenditures in 1924 will approximate very nearly $2,000,000, including the $204,826 proposed to be expended in Orange County.

"The forward march of progress in Orange County and in the entire Southland is well exemplified by these budget figures. They show, as perhaps nothing else could, the constant demand being made upon the public utilities to keep up with the phenomenal growth of the nation's wonderland."

Gas Man Testifies Mixed Gas Best

Cincinnati, Ohio—A series of questions to be asked the Union Gas & Electric Company relative to a new gas rate were formulated at a meeting of City Council's light committee. Two of the questions, as suggested by Joseph Reichert, chairman, apparently were answered in the letter sent to Council by W. W. Freeman, president of the company. They were:

Can the company furnish enough natural gas to supply peak loads for the city? The answer in Mr. Freeman's letter is no.

If natural gas can not be furnished, what gas is best, artificial or mixed artificial and natural gas? According to Mr. Freeman, the mixed gas would be best for Cincinnati.

The other questions were: Can the price of gas be made as low as the average price of gas in other cities and how much time will be taken by the gas company to arrange for new supplies?

The average price of gas in other cities using artificial or mixed gas is from $1 to $1.05, according to Mr. Freeman's letter. Frank Duttenhofer, councilman, and a member of the light committee, suggested that the company also be asked whether the mixed gas would be satisfactory for use in the various heating, lighting and cooking devices operated by gas in Cincinnati. Edwin Bathgate, clerk of the committees of Council, was instructed to send a copy of the questions to the gas company. Another meeting of the committee will be held when a reply is received, according to Chairman Reichert.

New Industrial Gas Rates for Indianapolis

Indianapolis, Ind.—The Public Service Commission has granted the petition of the Citizens Gas Company for reduction of gas rates to Indianapolis industrial consumers.

The rates approved are $1.05 for the first 50,000 cubic feet, with a graduation downward to 95 cents to users of 200,000 cubic feet or more.

The Commission also approved the 5-cent per 1,000 cubic feet discount on all bills paid within ten days.

The company struck out the clause asking for increase in minimum rate of 60 cents to 90 cents when the Commission disapproved.

Fred R. Cutcheon Becomes Manager of St. Joseph Gas Co.

Fred R. Cutcheon, who for the past several years has been manager of the Consolidated Gas Company of New Jersey, Long Branch, N. J., and who for one year was president of the New Jersey Gas Association, has taken the position of general manager of the St. Joseph Gas Company, St. Joseph, Mo.

Rate Stipulation May Kill Gas Deal

Brooklyn, N. Y.—The Board of Estimate has referred to Corporation Counsel Nicholson for opinion on the Hylan proposal to permit the transfer of the Flatbush Gas Company's franchise on Ocean avenue to the Brooklyn Edison Company, on condition that the latter agree that it will never change its rates for service.

The stipulation was the action of the Committee of the Whole in passing upon the Brooklyn Edison Company's request to take over the electric business of the Flatbush corporation.

The Edison company held that the stipulation made the deal impossible, for while the company promised an immediate reduction in rates to the Flatbush people, no promise for the future could be made, because the law provides that rates are fixed by the Public Service Commission. The Board of Estimate has no rate-making authority. Samuel E. Moran, representing the Edison Company, persuaded the board to refer the matter to the corporation counsel for a legal opinion before taking final action.

This means that there is still a chance for the deal to go through, provided the corporation counsel should advise the Mayor against the stipulation.

Utah Gas & Coke Co. Increases Capital Stock

Salt Lake City, Utah—Amendment to articles of incorporation of the Utah Gas & Coke Company increases capital stock of the company to $4,000,000 divided into 40,000 shares valued at $100 each. Joseph H. Brewer is named as president of the company.

Turlock Gas Co. Makes Its Report

Turlock, Cal.—Turlock Gas Company, operating in Turlock, reports to the Railroad Commission for the year 1923 that its operating revenue was $51,819.37; operating expenses, $40,444.83, giving a net operating revenue of $11,374.54. Interest, rent and other deductions totaled $2,373.62. The net corporate income for the year was $9,000.92. The surplus at the beginning of the year amounted to $25,232.48. Miscellaneous deductions were $596.42; leaving an accumulated surplus at the end of the year of $33,636.98.

New Gas Rates for La Crosse

La Crosse, Wis.—Gas rates will be reduced in La Crosse on July 1, in accordance with agreement entered into by City Attorney Oscar J. Swennes and officers of the Northern States Power Company. New rates will average a little more than 10 cents per thousand feet below present rates.

Formal approval of the new rates has been received from the railroad commission of Wisconsin, and John G. Felton, manager of the local utility, announced that the new rates will go into effect with all meter readings on and after July 1. Hence those who have their meters read on July 1 will have the reduced rates for the entire month of June.

New Manager of St. Charles Gas Company

St. Louis, Mo.—Henry Reeves, of the Union Electric Light & Power Company, has been made manager of the St. Charles Gas Company, to succeed J. W. Tierney, who resigned recently as manager of the plant.

Reeves, a native of St. Charles, has been for some time superintendent of the Union Electric plant at St. Charles. While he will serve as superintendent of both companies, there is no intent to consolidate them, according to word given out at the St. Louis office of the Union Electric Company.

The St. Charles Gas Company, formerly known as the St. Charles Lighting Company, went into the hands of a receiver about three years ago, resulting in its purchase by Louis H. Eagan, of St. Louis. During the past three months more than $30,000 has been expended on improvements and mains extensions.

Customer Ownership Sales

Customer ownership sales of preferred stocks of the operated public utility companies of Standard Gas & Electric Company for the month of May, 1924, amounted to $830,200 par value, there having been 1,514 separate sales.

Gas Co. to Aid in Industrial Survey

Cincinnati, O. — Announcement has been made that the Union Gas & Electric Company would co-operate with the Commercial Club in making an industrial survey of Cincinnati and vicinity. W. W. Freeman, president of the utility company, has informed E. B. Danson, chairman of the survey committee of the Commercial Club, that his company will give $25,000 toward the survey.

Mr. Danson said the action of the Union Gas & Electric Company would facilitate the work and complete the survey in half the time originally allotted. "The proposition," Mr. Danson said, "was presented to the Commercial Club on Saturday by Mr. Freeman, at White Sulphur Springs, W. Va., where the club held its spring outing."

The survey will be made under the direction of Dean Herman Schneider of the University of Cincinnati, and, according to Mr. Danson, work will be started as soon as the summer vacation period starts at the university.

"With the additional funds, Mr. Danson said, "the survey will be one of the most complete ever made in this country. Experts will be engaged to investigate every phase of the subject."

It was said that the Union Gas & Electric Company had planned to make an economic and industrial survey itself in connection with the building of its generating plant on the Ohio River near Cleves. Mr. Freeman laid his plans before Dean Schneider and after several conferences the gas and electric company decided to become a part of the proposition originally started by the Commercial Club.